


CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

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Attorney Docket No. HOS-62
MAIL STOP RCE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:) Group Art Unit: 1771
MORITA; MUROI; KAKUTA) Examiner: Hai Vo
Serial No. 09/996,777)
Filed: November 30, 2001)
For: **MULTIPLE LAYERS LAMINATED POLYOLEFIN FOAM**

Appendix A

Please amend the following claims as indicated in the following claims according to the revision to 37 C.F.R. § 1.121 concerning a manner for making claim amendments.

1. (Currently amended) A multiple layers laminated polyolefin foam having a plurality of polyolefin layers laminated on at least one side of a polyolefin foam by a co-extrusion foaming method and a xylene soluble content of 0 to 5 wt%, comprising:

wherein the thickness of the outermost layer constituting said plurality of polyolefin layers is 5 to 80 μm , and the density d (g/L) of said polyolefin foam, the melt flow rate X (g/10 min) of the polyolefin resin constituting the innermost layer among said plurality of polyolefin layers, and the

thickness Y (μm) of the innermost layer of said plurality of polyolefin layers satisfy the following relationships (1) to (4):

$$Y \leq 0.29 d X \quad \dots (1)$$

$$5 \leq X \leq 40 \quad \dots (2)$$

$$70 \leq Y \leq 300 \quad \dots (3)$$

$$100 \leq d \leq 300 \quad \dots (4)$$

wherein a thickness of an entire laminated foam is 3 to 8 mm and a closed cell ratio of the laminated foam is no less than 60%,

wherein the outermost layer contains a polymer type antistatic agent so that a surface layer resistivity is no more than $1 \times 10^{13} \Omega$,

wherein a ratio (α/β) of a melt flow rate (α) of the polymer type antistatic agent and a melt flow rate (β) of the base resin constituting the outermost layer among the polyolefin layers is no less than 0.5 and β is 3 to 35 g/10 min.

2. (Original) The multiple layers laminated polyolefin foam according to claim 1, wherein the density d (g/L) of the polyolefin foam is 120 to 300 g/L, the melt flow rate X (g/10 min) of the polyolefin constituting the innermost layer among

the polyolefin layers is 8 to 40 g/10 min, and the thickness Y (μm) of the innermost layer among the polyolefin layers is no more than 0.26dX.

3. (Original) The multiple layers laminated polyolefin foam according to claim 1, wherein the base resin constituting the polyolefin foam and the polyolefin layers in the multiple layers laminated polyolefin foam is of at least one type selected from polypropylenes and polyethylenes.

Claims 4-15 (Cancelled)

16. (Currently amended) The multiple layers laminated polyolefin foam according to claim ~~15~~ 1, wherein the polymer-type antistatic agent comprises a compound of at least one type selected from polyetheresteramides and polyethers as the main component.

17. (Previously presented) The multiple layers laminated polyolefin foam according to claim 16, wherein the polyetheresteramide is a polymer obtained by polymerization reaction of a polyamide with an alkylene oxide adduct of a bisphenol.

18. (Previously presented) The multiple layers laminated polyolefin foam according to claim 17, wherein the polyamide is of at least one type selected from caprolactam polymer, 12-aminododecanoic acid polycondensate, and adipic acid-hexamethylene diamine polycondensate.

19. (Previously presented) The multiple layers laminated polyolefin foam according to claim 16, wherein the polyether is a compound having at least two quaternary ammonium bases and is the reaction product of (a) an oxyalkylene ether obtained by addition reaction of an alkylene oxide with a phenol-divinyl benzene addition polymer, (b) one type of glycidyl ether selected from glycidyl ethers of polyoxyalkylene glycols and glycidyl ethers of adducts of phenols and alkylene oxides, an amine compound having an aliphatic hydrocarbon group containing 1 to 22 carbon atoms, and a quaternizing agent.

20. (Previously presented) The multiple layers laminated polyolefin foam according to claim 19, wherein (a) the polyoxyalkylene ether is an adduct obtained by the addition reaction of ethylene oxide and a copolymer of ethylene oxide and propylene oxide with a bisphenol-divinyl benzene addition polymer, (b) the glycidyl ether of polyoxyalkylene glycol is glycidyl ether of polyoxyethylene glycol, and the adduct of a

phenol and an alkylene oxide is an adduct of bisphenol and ethylene oxide.

21. (Currently amended) The multiple layers laminated polyolefin foam according to claim ~~15~~ 1, wherein the polymer-type antistatic agent is present in the outermost polyolefin layer in an amount of from 2 to 30 wt.%.

22. (Previously presented) The multiple layers laminated polyolefin foam according to claim 16, wherein the polymer-type antistatic agent is present in the outermost polyolefin layer in an amount of from 2 to 30 wt.%.

Claims 23-24 (Cancelled)

25. (Currently amended) The multiple layers laminated polyolefin foam according to claim 1 wherein ~~the thickness of the entire laminated foam is 2 to 10 mm and~~ the closed cell ratio of the laminated foam is at least no less than 70%.

26. (Currently amended) The multiple layers laminated polyolefin foam according to claim 1 wherein ~~the thickness of the entire laminated foam is 2 to 10 mm and~~ the closed cell ratio of the laminated foam is at least no less than 80%.

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Claims 27-29 (Cancelled)



Attorney Docket No. HOS-62
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:) Group Art Unit: 1771
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MORITA; MUROI; KAKUTA) Examiner: Hai Vo
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Serial No. 09/996,777)
)
Filed: November 30, 2001)

For: **MULTIPLE LAYERS LAMINATED POLYOLEFIN FOAM**

DECLARATION UNDER 37 CFR 1.132 OF
TAKASHI MUROI

Commissioner for Patents
Alexandria, VA 22314-1450

I, Takashi MUROI, hereby declare as follows:

1. I am a citizen of Japan residing at 222-11, Fudokorohon-cho, Kanuma-shi, Tochigi-ken, Japan.

2. I am one of the coinventors of the invention described and claimed in the captioned U.S. patent application. I am familiar with the claims as amended in our response filed with this declaration and I am familiar with the references including U.S. Patent No. 5,492,741 ("Akao et al.") cited by the Examiner as prior art against the captioned application.

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3. I obtained a Master's degree from Utsunomiya National University, Department of Applied Chemistry in 1994 and joined JSP Corporation in the same year. Since then, I have been mainly engaged in research and development of extrusion and foaming of thermoplastic materials, in particular, coextrusion of polyolefin-based resins. I am now an assistant manager of the Sheet Group of Kanuma Laboratory of JSP Corporation.

4. I have personal knowledge of the test which generated the comparative data set forth below, the test being performed under my supervision.

Comparative Experiments 1 and 2

The procedure described in Example 2 of the specification of the captioned application was repeated in the same manner as described for Experiments 1 and 2 except resins shown in Table I below were used.

The Resin (1) for the foam sheet of Experiments 1 and 2 is the same as the Resin VI used in the Examples of the specification. See page 32, line 13-14. However, the Resins (2) and (3) for the innermost and outermost layers of Experiments 1 and 2 are different from those used in the

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specification. In particular, the Resin (2) and (3) have a MFR of 40 (g/10 min) and 50 (g/10 min), respectively.

The obtained polyolefin resin laminated foams is each composed of a foam sheet, an innermost layer and an outermost layer. The mixed blowing agent was charged in an amount of 2.1 parts by weight per 100 parts by weight of the polypropylene resin constituting the foam sheet.

Table I lists the resin properties and results for the Experiments 1 and 2.

Table II lists the innermost resin layer and outermost resin layer. The Experiments 1 and 2 are highlighted at the bottom of the table.

Table III lists the innermost resin layer and the outermost resin layer. The Experiments 1 and 2 are highlighted at the bottom of the table.

The thus obtained laminated foams were measured for the density, thickness, closed cell ratio and surface resistivity in the same manner as described in the specification of the captioned application.

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Table I
(Resin types for Experiments 1 and 2)

| | | Experiment 1 | Experiment 2 |
|---|---|----------------------|----------------------|
| Foam Sheet (FS) | Kind | Resin (1) | Resin (1) |
| | Crystallization Temperature TC (°C) | 134 | 134 |
| Innermost Layer (IL) | Kind | Resin (2) | Resin (2) |
| | MFR (X) (g/10 min) | 40 | 40 |
| | Thickness (Y) (μm) | 150 | 150 |
| Outermost Layer (OL) | Kind resin (antistatic agent/ Polyolefin resin) | Polymer A/ Resin (2) | Polymer A/ Resin (3) |
| | Amount of Polymer A (wt.%) | 15 | 15 |
| | Crystallization Temperature of Polymer A (°C) | 143 | 143 |
| | MFR α of Polymer A (g/10 minute) | 17 | 17 |
| | MFR β of Polypropylene resin (g/10 minute) | 40 | 50 |
| | MFR Ratio α/β | 0.4 | 0.3 |
| | Thickness (μm) | 28 | 28 |
| Basis Weights of OL/IL/FS/IL/OL (g/m ²) | | 25/135/480 /135/25 | 25/135/480 /135/25 |
| Laminated Foam | Density (d) (g/L) | 130 | 130 |
| | Thickness (mm) | 4.0 | 4.0 |
| | Closed cell ratio (%) | 84 | 85 |
| | Surface resistivity (Ω) | 7.5x10 ¹³ | 9.2x10 ¹³ |

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Resin (1): SunAllomer Ltd., trade name SD632 (polypropylene resin), MFR: 3.2 g/10 min, Crystallization temperature: 134°C

Resin (2): Idemitsu Petrochemical Co., Ltd., trade name J3035HP (propylene-ethylene block copolymer)
MFR: 40 g/10 min

Resin (3): Idemitsu Petrochemical Co., Ltd., trade name J5051HP (propylene-ethylene block copolymer)
MFR: 50 g/10 min

Polymer A: Ciba Specialty Chemicals K.K., trade name IRGASTAT P18 (polymer-type antistatic agent
Containing polyetheresteramide and polyamide)
MFR: 17 g/10 min, melting point: 180°C,
Crystallization temperature: 143°C

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TABLE II
(Innermost Layer and Outermost Layer)

| | | Innermost resin layer | | Laminated foam | | | | 0.29dX |
|----------------------|----|-----------------------|-----------------------------|------------------------------|----------------|-----------------------|----------------------------------|--------|
| | | MFR : X (g/10 min) | Thickness : Y (μ m) | Density of foam : d (g/L) | Thickness (mm) | Closed cell ratio (%) | Surface resistivity (Ω) | |
| Examples | 1 | 5 | 194 | 225 | 3.1 | 87 | 1.5×10^{12} | 326 |
| | 2 | 10 | 150 | 130 | 4.0 | 85 | 6.6×10^{10} | 377 |
| | 3 | 17 | 150 | 130 | 4.0 | 87 | 5.8×10^{11} | 641 |
| | 4 | 10 | 150 | 130 | 4.0 | 73 | 3.2×10^{12} | 377 |
| | 5 | 10 | 150 | 130 | 4.0 | 83 | 4.3×10^{12} | 377 |
| | 6 | 32 | 150 | 130 | 4.0 | 87 | 6.2×10^{12} | 1206 |
| | 7 | 5 | 150 | 130 | 4.0 | 82 | 9.5×10^{10} | 189 |
| | 8 | 10 | 150 | 130 | 4.0 | 85 | 6.7×10^{10} | 377 |
| | 9 | 17 | 150 | 130 | 4.0 | 87 | 4.4×10^{10} | 641 |
| | 10 | 10 | 150 | 130 | 4.0 | 84 | 1.5×10^{12} | 377 |
| | 11 | 12 | 117 | 143 | 4.0 | 86 | 2.4×10^{12} | 498 |
| | 12 | 12 | 154 | 143 | 5.0 | 82 | 3.0×10^{12} | 498 |
| Comparative Examples | 1 | 5 | 194 | 130 | 5.0 | 55 | 1.5×10^{12} | 189 |
| | 2 | 2 | 150 | 130 | 4.0 | 42 | 1.2×10^{11} | 75 |
| | 3 | 5 | 194 | 111 | 4.0 | 50 | 8.0×10^{10} | 161 |
| Experiment | 1 | 40 | 150 | 130 | 4.0 | 84 | 9.5×10^{13} | 1508 |
| | 2 | 40 | 150 | 130 | 4.0 | 85 | 9.2×10^{13} | 1508 |

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TABLE III
(Innermost Layer and Outermost Resin Layer)

| Examples | Innermost resin layer | | | Outermost resin layer | | | | Basis weight of each layer of laminated foam (outermost resin layer/foam/innermost resin layer/outermost resin layer) (g/m ²) |
|----------|-----------------------|----------------|----------------------|-----------------------|-----------------------------------|--------------------|----------------------|---|
| | Type | MFR (g/10 min) | Layer Thickness (μm) | Type | Amount of antioxidant added (wt%) | MFR α/β (g/10 min) | Layer thickness (μm) | |
| 1 | Resin I | 5 | 194 | Polymer A/Resin I | 15 | 17/5 | 28 | 25/175/600/172/25 |
| 2 | Resin II* | 10 | 150 | Polymer A/Resin II | ditto | 17/10 | ditto | 25/135/480/135/25 |
| 3 | Resin III | 17 | 150 | Polymer A/Resin III | ditto | 17/17 | 28 | 25/135/480/135/25 |
| 4 | Resin II* | 10 | 150 | Polymer B/Resin II | 15 | 21/10 | ditto | ditto |
| 5 | Resin II* | 10 | 150 | Polymer C/Resin II | 20 | 70/10 | ditto | ditto |
| 6 | Resin IV | 32 | 150 | Polymer C/Resin IV | ditto | 70/32 | ditto | ditto |
| 7 | Resin I* | 5 | 150 | Polymer E/Resin I | ditto | 100 or more/5 | ditto | 25/135/480/135/25 |
| 8 | Resin II* | 10 | 150 | Polymer E/Resin II | ditto | 100 or more/10 | ditto | ditto |
| 9 | Resin III* | 17 | 150 | Polymer E/Resin III | ditto | 100 or more/17 | ditto | ditto |

Continued

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| | | | | | | | | | |
|-------------------------|----|----------------------------|----|-----|---|----|-------------------|-------|-------------------|
| | 10 | Resin II | 10 | 150 | Polymer D/Resin V | 20 | 20/2 | ditto | 25/135/480/135/25 |
| | 11 | Resin VII/Resin VIII | 12 | 117 | Polymer E/Resin VII/Resin VIII | 15 | 100 or more/12 | 27 | 25/108/533/108/25 |
| | 12 | Resin VII/Resin VIII | 12 | 154 | Polymer E/Resin VII/Resin VIII | 15 | 100 or more/12 | 27 | 25/142/667/142/25 |
| Comparative Examples | 1 | Resin I | 5 | 194 | Polymer A/Resin I | 15 | 17/5 | 28 | 25/175/600/175/25 |
| | 2 | Resin V | 2 | 150 | Polymer E/Resin V | 15 | 100 or more/2 | 28 | 25/135/480/135/25 |
| | 3 | Resin I | 5 | 194 | Polymer E/Resin I | 15 | 100 or More/5 | 28 | 25/175/400/175/25 |
| Experiment | 1 | Resin (2) | 40 | 150 | Polymer A/Resin (2) | 15 | 17/40 | 28 | 25/135/480/135/25 |
| | 2 | Resin (2) | 40 | 150 | Polymer A/Resin (3) | 15 | 17/50 | 28 | 25/135/480/135/25 |

*Thermoplastic elastomer (ethylene - octane random copolymer, MFR = 10.6 g/10 min), trade name AFFINITY EG8200 made by DOW CHEMICAL JAPAN, LTD., of 2.5 wt% was further added.

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5. Conclusion

The MFR ratio α/β of resins of Experiments 1 and 2 is 0.3 and 0.4 and resulted in laminated foams that do not exhibit satisfactory antistatic properties. In contrast, the α/β ratios of the present invention are in a range between 2.2 to 10. Those of the claimed invention clearly show unexpected results over the Akao et al. reference, which fails to teach α/β ratios.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

July 5, 2004
(2004. 7. 5)

Date

Takashi Muroi

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